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A simple technique for gamma ray and cosmic ray spectroscopy using plastic scintillator

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A simple and new technique has been developed for gamma ray and cosmic ray muon pulse height spectroscopy without using SCA or MCA. Only scintillator detector, a leading edge discriminator and a NIM scaler have been used in this technique. Gamma ray spectrum has been obtained for Co60 and Cs137 sources. Proportionality in energy and pulse height has been observed. The energy resolution for the detector has been found to be 9.3% and 7.6% for the Co60 1.17 MeV and 1.33 MeV peak respectively and 10.2% for 662 keV peak of Cs137. Cosmic ray muon pulse height spectrum has been obtained for two scintillators and fitted with Landau distribution. The most probable energy deposition in 1 cm thick plastic material has been found to be ~ 1.4 MeV. Although the energy resolution is not so good but still using plastic scintillator detector gamma spectroscopy and cosmic ray muon pulse height spectroscopy can be done. Main drawback of this technique is that this process is time consumable and may not be useful for real experiment; however, this process is very useful and can be applied for laboratory measurement where MCA or SCA are not available.

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